New Guinea has never been penetrated to any considerable distance, except along the course of rivers. Lieut. Armit only went twenty-five to thirty miles inland.——The death of M. de Brazza has been reported, but the report is now ascertained to be untrue. The *Revue de Geographie* states that harmony reigns between this explorer and the International Association.——M. de la Croix stated before the Geographical Society of Paris that he distinctly heard the detonations of the eruption of Krakatoa, though he was then at Lahat, 746 miles distant. M. Brau de St. Pol Lias informed the same society that Tolok-Betoung is now no more a seaport, since a barrier of pumice, nineteen miles in length, two-thirds of a mile in width, and from thirteen to sixteen feet deep, has, since the eruption, formed a floating jetty in front of the entrance of the harbor. The official number of the victims of the explosion is 15,000.——The Bolivian government has despatched an expedition against the Tobas (the murderers of Dr. Crevaux). M. Thouar accompanies it, and intends to survey the Pilcomayo river, and to verify the existence of its reported affluent, the Guayra.——M. Milne-Edwards has asserted before the Geographical Society of Paris that the bathymetrical map of the Atlantic ocean, published under German authority, is a work of fiction. In one place where the map marks 3000 fathoms, the *Talisman* expedition found 6000; and in another where the lead descended 3000 fathoms, the map showed 1000 only. The curves do not in any way correspond with the real relief of the Atlantic. The bottom of the Sargasso sea (3280 fathoms) is entirely volcanic, and thus the submarine fauna is poor. The soundings of this vessel will add greatly to our knowledge of the configuration of the Atlantic bed between Cape Verd and the Azores.——The Bay of Diego-Suarez, one of the finest harbors of the world, situated on the eastern coast of Madagascar, at a short distance from Cape d'Ambre, and so near the northern end of the island as to have easy communication with both the ocean and the Mozambique channel, belongs to the French, to whom it was ceded by Radama II.——Among the population of the southern portion of the western coast of Russia in Asia are some Chinese, most of whom are outlaws, but become cultivators of the soil when on Russian territory, and many Coreans.

GEOLOGY AND PALÆONTOLOGY.

THE HISTORY OF THE OREODONTIDÆ.—The following paragraphs, containing a synoptic view of the history of the Oreodontidæ, is taken from a paper recently read before a meeting of the American Philosophical Society:.

From what is now known of the history of the Oreodontidæ, the following conclusions may be drawn. These are especially instructive as far as they go, since they involve the causes of the rise, great development, decadence and extinction of one

of the best marked types of Mammalia the world has seen. The history of this type involves more or less the history of the life of the North American continent during the Miocene epoch of Tertiary time. It moreover involves the laws which regulate the vital success of all types of life, and which express the causes of multiplication, of energy, of weakness and of sterility.

Two lines of the family, the Oreodontinæ and the Agriochœrinæ, come to light simultaneously in geological time, the White River epoch, or the Oligocene. The latter is a higher type than the former, in its more complex fourth premolars, while it is inferior in the non-closure of the orbits posteriorly. It may then be regarded as a parallel line. It has but two generic types, while the Oreodontinæ present us with seven. So far as yet known, the Agriochœrinæ did not continue as long as the Oreodontinæ, as will be shown in tabular form below.

In the progressive modifications of the Oreodontine series, the first step was the inflation of the otic bulla (genus Eucrotaphus). This was succeeded by the coössification of the premaxillary bone (genus Merycochœrus). These changes were accompanied by a regular increase in dimensions. The species of Merycochœrus are all of the largest size, and there are no small ones. The smallest species of Eucrotaphus are equal to the largest ones of Oreodon. The fourth genus, Merychyus, while it loses none of the points already gained, shows a deficiency in its facial walls, where vacuities appear. There is the greatest range of size here: with one species (*M. major*) as large as any of the Merycochœri, we have another as large as the usual Eucrotaphi (*M. zygomaticus*), and several one degree smaller, or as large as the largest Oreodons. In the next genus the facial vacuities have attained to an enormous size. The premolar teeth become smaller, and the weakness of the narrow symphysis of the lower jaw is made up for by its coössification. The size is reduced from equal to the smallest Merychyi to that of the smallest Oreodons (genus Leptauchenia). In the next stage (genus Cyclopidius) the superior incisors disappear. Finally, the lower jaw is so reduced in front that it loses both incisors and premolars, in spite of its symphyseal coössification (genus Pithecistes).

The species may be thus arranged in accordance with their distribution in time:

White River epoch.—Oreodon gracilis; O. affinis; O. culbertsoni. Eucrotaphus jacksoni; E. major. Agriochœrus antiquus; A. major; A. latifrons.

John Day epoch.—Eucrotaphus jacksoni; E. major. Merycochœrus superbus; M. leidyi; M. chelydra, sp. nov.; M. macrostegus, sp. nov. Agriochœrus guyotianus; A. trifrons, sp. nov.; A. ryderanus. Coloreodon macrocephalus.

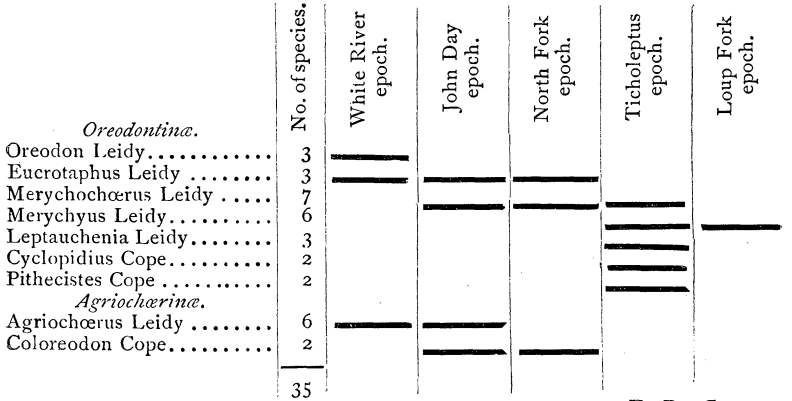
North Fork of John Day River epoch.—Eucrotaphus trigono-

cephalus, sp. nov.; E. major. Coloreodon ferox; C. macrocephalus.

Ticholeptus beds.—Merycochœrus montanus, sp. nov.; M. rusticus, M. proprius. Merychyus arenarum, sp. nov.; M. pariogonus, sp. nov.; M. zygomaticus. Cyclopidius simus; C. emydinus, sp. nov. Leptauchenia major; L. decora; L. nitida. Pithecistes brevifacies; P. heterodon; P. decedens, sp. nov.

Loup Fork beds.—? Merychyus elegans; M. medius; ? M. major.[1]

The stratigraphic relations of these species may be represented under their generic heads in the following table:



—*E. D. Cope.*

PROFESSOR OWEN ON FOSSIL MAMMALS.—Professor R. Owen has recently described, from incisor teeth and their casts, *Sceparnodon ramsayi*, a mammal with rodent upper incisors, as in the wombat, but probably equal in size to a tapir. The microscopic characters of both enamel and dentine indicate its marsupial affinities. The remains are from the Pleistocene of Queensland. At the same meeting of the Royal Society (Nov. 15) Professor Owen described a humerus from the breccia cave in Wellington valley. Apparently this belonged to an Echidna of very large size.

At the next meeting Professor Owen described the skull of a Triassic mammal from South Africa (*Tritylodon longævus*). The teeth resemble those of Microlestes from the Keuper of Würtemberg and the Rhætic of Somerset, and those of Stereognathus from the Oölite. The fossil presents no characters to show definitely whether it was a placental or non-placental. It is evidently allied to the Meniscoëssus of the Laramie and Polymastodon of the Eocene.

FRITSCH ON THE PERMIAN FAUNA OF BOHEMIA.—Dr. Fritsch continues his work on the Vertebrata of the Permian gaskohle of Bohemia. The last number (pp. 159–182) contains descriptions of the following species and genera: Hylonomidæ, *Hyloplesion*

[1] The question refers to the geological age.

longicostatum; Seeleya pusilla; Ricnodon copei; R. dispersus; R. trachylepis; Orthocosta microscopica. Microbrachidæ, *Microbrachis pelekani; M. mollis; M. branchiophorus.* These species are fully described and admirably illustrated. In the Hylonomidæ Dr. Fritsch includes the genera Hylonomus Daws., Smilerpeton Daw., Hyloplesium Fr., Seeleya Fr., and Orthocosta Fr. In the Microbrachidæ he is inclined to include, besides Microbrachis, the American genera Tuditanus and Cocytinus Cope.

FILHOL ON EOCENE LEMUROIDS.—Dr. Henri Filhol has published in the *Annales des Sciences Geologiques* a valuable illustrated paper on the two lemuroid genera Necrolemur Filh., and Adapis Cuv. His object is firstly to show that these genera are distinct from certain American genera; and second, to describe the limb-bones and dental variations of the species of Adapis. As regards the first proposition it results from a statement by myself that the Necrolemur is identical with Anaptomorphus Cope, and the Notharctus Leidy, is identical with Adapis Cuv. Dr. Filhol shows that both these identifications are erroneous. The first correction I have already made in my forthcoming volume on the Tertiary Mammalia of the West, which has been in press about a year. I do not remember that I had published this conclusion prior to my Palæontological Bulletin No. 37, p. 318 (January 2, 1884), though it may be inferred from my language in the Proceedings American Philosophical Society, 1881, p. 154. It is also expressed in the January, 1884, number of the AMERICAN NATURALIST, Dec. 29, 1883. Necrolemur has three premolars and Anaptomorphus has but two. As Dr. Filhol remarks, he has made no detailed description of the teeth in his account of Necrolemur in the Recherches sur les Phosphorites de Quercy, hence the difficulty I experienced in determining at first its dental formula. The differences in the detailed structure of the molar teeth of the two genera, now pointed out by Dr. Filhol, are mostly due to differences of wear.

Dr. Filhol has obtained the canine and incisive series of Adapis, and can show that they are of generally identical structure. This discovery furnishes the needful desideratum for the distinction of that genus from Notharctus. Hitherto no characters sufficient to indicate a difference were known.

Dr. Filhol gives a figure of a nearly complete skull of *Adapis parisiensis.* His figures of the limb bones of the same species shows that they greatly resemble those of Tomitherium.—*E. D. Cope.*

THE MINERAL PRODUCTS OF THE UNITED STATES FOR 1882–3. —It is impossible to state the total mineral product in any form which shall not be open to just criticism. It is evident that the production statistics of such incongruous substances as iron ore, metallic gold and silver; the spot value of coal mined, and the

market value of metallic copper after having been transported hundreds of miles; the spot value of a crude substance like unground, unrefined barytes, and the value of a finished product like brick (in which the cost of manufacture is the leading item), such details cannot well be taken as items in a general summary. The statistics have been compiled with a view to giving information on those points which are of most interest and utility, and are presented in the form usual in the several branches of trade statistics. The result is that the values stated for the different products are necessarily taken at different stages of production or transportation, etc. Theoretically perfect statistics of mineral products would include first of all the actual net spot value of each substance in its crudest form, as taken from the earth; and yet for practical purposes such statistics would have little interest other than the fact that the items could be combined in a grand total in which each substance should be rated on a fairly even basis. The following groupings, therefore, are presented with a full realization of the incongruity of many of the items:

Values of the metallic products of the United States in 1882.

Pig iron, spot value	$106,336,429
Silver, coining value	46,800,000
Gold, coining value	32,500,000
Copper, value at New York city	16,038,091
Lead, value at New York city	12,624,550
Zinc, value at New York city	3,646,620
Quicksilver, value at San Francisco	1,487,537
Nickel, value at Philadelphia	309,777
Antimony, value at San Francisco	12,000
Platinum, value at New York city	1,000
Total	$219,756,004

Values of some of the non-metallic products of the United States in 1882 (all spot values except chrome iron ore).

Bituminous coal, brown coal, lignite and anthracite mined outside of Pennsylvania	$76,076,487
Pennsylvania anthracite	70,556,094
Crude petroleum	23,704,698
Lime	21,700,000
Building stone	21,000,000
Salt	4,320,140
Cement	3,672,750
Limestone for iron flux	2,310,000
Phosphate rock	1,147,830
New Jersey marls	540,000
Crude borax	338,903
Mica	250,000
Crude barytes	160,000
Chrome iron ore, value at Baltimore	100,000
Soapstone	90,000
Manganese ore	52,500
Asbestos	36,000
Graphite	34,000
Sulphur	21,000
Cobalt ore and matte	15,000
Precious stones, uncut	12,500

Asphaltum	$10,500
Corundum	6,250
Pumice-stone	1,750
Total	$226,156,402

Résumé of the values of the metallic and non-metallic mineral substances produced in the United States for 1882.

Metals	$219,756,004
Mineral substances named in the foregoing table	226,156,402
	$445,912,406
Fire-clay, kaolin, potters' clay, common brick clay, terra-cotta, limestone used as flux in copper and lead smelting, iron ore used as flux in lead smelting, pyrites (for acid making), zinc white made directly from ore, marls (other than New Jersey), apatite, gypsum, tin ore, bismuth, arsenic, iridosmine, mill-buhrstone and stone for making grindstones, lithographic stone, talc (other than "soapstone"), quartz, feldspar, fluorspar, terra-alba, chalk, crude mineral paints, nitrate of soda, carbonate of soda, sulphate of soda, native alum, ozocerite, mineral soap, strontia, etc.—certainly not less than	8,000,000
Grand total	$453.912,406

The grand total might be considerably reduced by substituting the value of the iron ore mined for that of the pig iron made; by deducting the discount on silver, and by considering lime, salt cement, borax, etc., as manufactures. It will also be remarked, that the spot values of copper, lead, zinc and chrome iron ore are much less than their respective values after transportation to market.

[Abstract from a report entitled "The Mineral Resources of the United States," by Albert Williams, Jr., chief of Division of Mining Statistics and Technology, United States Geological Survey, for the calendar year 1882 and the first six months of 1883.]

GEOLOGICAL NOTES.—*General.*—Among the volumes issued by the U. S. Geological Survey is a review of the non-marine fossil Mollusca, by C. A. White. The work is illustrated with thirty-two plates. Mr. White notices that five of the types that are recognized among the fauna of the Laramie group, Bathyomphalus, Cerithidea, Pyrgulifera, Melanopsis and Melania, have never been found among the living fauna of North America, but are represented by living species in the old world. The ten species of Unio described by Dr. Lea are referred to living species. Professor Hall believes that the two bivalves, *Cypricardites catskillensis* and *C. angustata*, described by Vanuxem from the Lower Devonian, truly belong to Anodonta. These excepted, the earliest Unionidæ known are two or three species collected by Professor Cope in the valley of Gallinas creek, New Mexico, from strata of Triassic, or perhaps Jurassic age.——M. Petiton (Bull. Soc. Geol. France, 1883) gives a sketch map of Lower Cochin China, showing the vast recent deposits of the Mekong delta,

extending over the whole of the peninsula that terminates at Pt. Camao. The interior of this peninsula, and large areas in the Me-kong, are completely marshy. Further north, on the Gulf of Siam, is a sandy tract traversed by granitoid mountains, and with a mass of sandstone in the center. In the north of the region is a porphyritic mass and one of sandstone. The chief mountain mass is to the west, in Baria and Bienhoa, and consists of four separate chains of granitoid rocks. A great part of Bienhoa, Longh-Thanh and Baria is covered with an extensive deposit of ferruginous clay, often containing so much iron as to become a veritable iron ore. This is often used as a building stone, and even at Saigon for macadam, a use for which its friable nature unfits it. M. Petiton states that in Cambodia, in many mountains to the north of Udong and to the west of the River Toule Sap, he has found microgranulite, granulite, porphyry and petrosiliceous porphyry. To the east of the river lies the mountain Pnom Neang Canh Rey, composed of the last named mineral, and iron mines and lime quarries also exist in the region. To the south-west of Pursat commences the enormous formation of more or less porphyritic sandstone, which extends thence westward into the Siamese province of Battambang. Very little stratification has been yet met with in Lower Cochin China, and the only fossil found was an encrinite in the limestone of Hatien.

Silurian.—Axel Tullberg contributes to the Zeitschrift der Deutschen geologischen Gesellschaft, a review of the Silurian beds of Scania, with a comparison with other similar formations. The Silurian beds of Scania are both palæontologically and petrographically very different from those of Northern Sweden. The Silurian of the islands Oeland and Gothland, East and West Gothland and Dalecarlia is, in great part, composed of limestone, with a rich fauna of trilobites, brachiopods, cephalopods, corals and crinoids; whilst in Scania the limestone is much reduced, and the great mass of the strata consists of graptolite-bearing schists. The thickness of the Upper Silurian is estimated at from 1480 to 1780 meters. This is distinguished into three stages, of which the middle one, the Cyrtographic shales, is about 350 meters thick, and the lower, or Rastrites shales, 120 meters thick. The upper stage of the Upper Silurian is in parts represented by about 1000 meters of Cardiola shales, the equivalent of the Ludlow shales of England; while four other groups which are locally developed correspond to the Dowton sandstone and Aimestry limestone of that country. The Lower Silurian beds are of gray limestones and shales. These strata have a thickness of 350 meters, while the Cambrian or "primordial Silurian" is only some 120 meters thick.——F. Nœtling (Zeit. Deut. Geol. Gesell., 1883) has a note upon the systematic position of the genus Porambonites, and describes two new forms, *P. schmidtii* and *P. baueri.* Both occasionally occur in boulders. Comparison of the charac-

ters of the valves and internal supports leads our authority to place Pentamerus and Porambonites in the same family Porambonitidæ. The genus Porambonites leads upwards towards the Strophomenidæ, while Pentamerus points towards the Rhynchonellidæ.

Devonian.—E. Kayser (Zeit. Deut. Geol. Gesell., 1883) describes two new goniatites and four new brachiopods from the Devonian of the Rhine.

Carboniferous.—In the *Geological Magazine*, Dec., 1883, Mr. H. Woodward continues his synopsis of the genera and species of carboniferous trilobites, characterizing four species of Brachymetopus, one of which is new. The same writer has also some notes on the nature of the two pits, or pores, placed one on each side of the glabella, in front of the compound eyes. He inclines somewhat to the belief that they may, as suggested by Mr. J. Young, be the marks of ocelli, such as occur in the Merostomata, both recent and fossil. If so, this would be further evidence of the affinities of both groups with the Arachnida. The pore is, however, present in the isopodous genera Sphæroma and Serolis, as well as in Limulus.

Permian.—H. Credner (Zeit. Deut. Geol. Gesell., 1883) contributes a fourth article upon the Stegocephali of the Rothliegenden near Dresden. *Branchiosaurus gracilis*, *Acanthostoma vorax*, *Melanerpeton spiniceps* and *Discosaurus permianus* are described. The last belongs to the family Limnerpetideæ.

Mesozoic.—Emil Haug (Neues Jahrb. für Min., Geol. und Pal.) reviews the so-called Chætetes of the Mesozoic strata. Of these he describes *Monticulipora recubariensis* from the Trias; *Chætetes beneckei*, a true Chætetes, from the gray limestone of the Lias of Southern Tyrol, and *Pseudochætetes polyporus*.

Tertiary.—The ninth volume of the Memoirs of the Swiss Palæontological Society contains a report upon the chelonians of the Vaudois molasse preserved in the Museum of Lausanne, by Dr. Portis. Three new species of Emys, one of Kinosternon, one of Cistudo, three of Trionyx are described, and a list of twenty-five species is given. In an appendix the same writer describes the new genus and species *Polysternon provinciale* from the Upper Cretaceous of Fuveau. The plastron of this species is peculiar from the presence of a pair of osseous plates between the hypoplastrons, which are very much shortened, and the xiphi-plastrons. These are styled by Portis prosteto-plastrons. The memoir is illustrated by twenty-nine plates.——Dr. Lemoine describes four species of Adapisorex, distinguished by the variable dimensions of the maxillaries and the well characterized form of the last premolar. These are *A. gaudryii*, *chevilionii*, *remensis* and *minimus*. All are of very small size and, as signified by the generic name, have affinities with the Tertiary Adapis on the one

hand, and on the other with the recent Soricidæ. All have been found in the Lower Eocene near Rheims.

Recent.—F. E. Geinitz (Zeit. Deut. Geol. Gesell.) states that the observations he has made during the last four years on the eastern part of the Mecklenburg coast prove that it is now sinking. ——F. Noetling (*loc. cit.*) gives a catalogue of the Diatomacea of the diluvium of Western Prussia, with particulars respecting the manner and quantity of their occurrence.——M. Virlet d'Aoust (Bull. Soc. Geol. France, 1883) contributes some valuable remarks upon the incessant formation of minerals, in various rocks, by means of molecular transport and displacement. A geode containing a small bell of the Gallo-Roman epoch is referred to, found probably in an ancient alluvial deposit at Conde'-sur Itón. M. d'Aoust states that he has proved that all flint geodes, buhr-stones, etc., are the result of molecular movements that have taken place since the formation of the rocks, and that limonites and the iron ores of alluvial beds have the same origin and are still in course of formation. He instances a geode found in a vine at Perigueux, a veritable eagle-stone,—hematite enclosing 200 silver pieces of coin of the fifteenth and sixteenth centuries. The re-formation of flint where buhr-stones have been taken out, is spoken of as a fact known to the quarrymen, as also that of grains of iron ore in alluvial clays.

BOTANY.[1]

THE AUGUST FLORA OF THE DISMAL SWAMP AND VICINITY.—The celebrated Dismal Swamp occupies the greater part of five counties, viz., Nasemond and Norfolk counties in Virginia, and Gates, Camden and Pasquotank counties in North Carolina, covering in all some 300 square miles of surface. A large portion of this vast area, being practically inaccessible, is still unexplored.

The swamp begins about ten miles south-west of Norfolk, and is best reached by taking passage on a small steamboat which plies between that place and Elizabeth City, N. C., *via* the Dismal Swamp canal. This canal passes within three miles of Drummond's lake, with which it is connected by a feeder. There are three or four places in the swamp where the boat makes regular stops, but there is no hotel, or even a decent cabin, within twelve miles of the lake.

The water in the canal is of a sinister blackness, very suggestive of malaria and chills, yet it is both healthful and palatable, and the swamp is the only locality on the southern coast entirely free from malaria. The water has the bitter flavor of tannic acid, derived from the juniper vegetation of the swamp.

A considerable population of whites and negroes subsist by the lumber trade, which is the great industry of this region, although

[1] Edited by PROF. C. E. BESSEY, Ames, Iowa.